

## CLAIMS

1. An Optical laminate comprising a supporting substrate, an adhesive layer, a cholesteric liquid crystal layer, and a protection layer laminated in this order, wherein said cholesteric liquid crystal layer has on at least a part thereof a region exhibiting diffractivity and a cholesteric liquid crystal phase wherein the helical axes are not homogeneously parallel with each other in the direction of the thickness.

2. The optical laminate according to claim 1, wherein said cholesteric liquid crystal layer having on at least a part thereof a region exhibiting diffractivity has a cholesteric liquid crystal film onto which a diffraction pattern is transferred, produced by contacting a diffraction grating with said cholesteric liquid crystal film formed on an alignment substrate so as transfer the diffraction pattern of said grating thereon, and then removing said diffraction grating from said film and peeling off said alignment substrate.

3. The optical laminate according to claim 2, wherein said cholesteric liquid crystal film is formed from a polymeric liquid crystal having the following physical characteristics:

- (1) weight-average molecular weight (Mw) in terms of polystyrene measured by GPC = 1000 to 100000;
- (2) molecular weight distribution (Mw/Mn wherein Mn

is number-average molecular weight) = 5 or less;  
(3) inherent viscosity measured in a mixed solvent of phenol/tetrachloroethane of 60/40 weight ratio at 30 °C and a polymeric liquid crystal concentration of 0.5g/dl = 0.05 to 2.0;  
(4) glass transition temperature ( $T_g$ ) = 200 °C or below; and  
(5) transition temperature from liquid crystalline phase to isotropic phase ( $T_i$ ) = 40 °C or higher.

4. The optical laminate according to claim 1 wherein said laminate is produced by the following steps:

- (a) forming a cholesteric liquid crystal film on an alignment substrate;
- (b) contacting a diffraction grating with said film so as to transfer the diffraction pattern of said grating on the surface of said film;
- (c) bonding said diffraction pattern-transferred film surface to a supporting substrate through an adhesive so as to prepare a 4-layered laminate of said supporting substrate/adhesive layer/diffraction pattern-transferred cholesteric liquid crystal film/alignment substrate;
- (d) peeling off said alignment substrate from said 4-layered laminate so as to prepare a 3-layered laminate of said supporting substrate/adhesive layer/diffraction pattern-transferred cholesteric liquid crystal film; and
- (e) forming a protection layer on said cholesteric

liquid crystal film of said 3-layered laminate.

5. The optical laminate according to claim 1 wherein said laminate is produced by the following steps:

(a) forming a cholesteric liquid crystal film on an alignment substrate;

(b) contacting a diffraction grating with said film so as to transfer the diffraction pattern of said grating on the surface of said film;

(c) bonding said diffraction pattern-transferred film surface to an easily peelable substrate through a reactive adhesive containing an ultraviolet absorber and/or a hard coat agent and peeling off said alignment substrate so as to prepare a 3-layered laminate of said easily peelable substrate/protection layer/diffraction pattern-transferred film;

(d) bonding said cholesteric liquid crystal film of said 3-layerd laminate to a supporting substrate through an adhesive so as to prepare a 5-layered laminated of said easily peelable substrate/protection layer/diffraction pattern-transferred film/adhesive layer/supporting substrate; and

(e) peeling off said easily peelable substrate from said 5-layered laminate.

6. A polarizing diffraction element comprising a supporting substrate, an adhesive layer, a cholesteric liquid crystal layer, and a

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protection layer wherein said cholesteric liquid crystal layer has on at least a part thereof a region exhibiting diffractivity and a cholesteric liquid crystal phase wherein the helical axes are not homogeneously parallel with each other in the direction of the thickness..

7. A compensation element for a liquid crystal display comprising a supporting substrate, an adhesive layer, a cholesteric liquid crystal layer, and a protection layer wherein said cholesteric liquid crystal layer has on at least a part thereof a region exhibiting diffractivity and a cholesteric liquid crystal phase wherein the helical axes are not homogeneously parallel with each other in the direction of the thickness.

8. A decorative component comprising a supporting substrate, an adhesive layer, a cholesteric liquid crystal layer, and a protection layer wherein said cholesteric liquid crystal layer has on at least a part thereof a region exhibiting diffractivity and a cholesteric liquid crystal phase wherein the helical axes are not homogeneously parallel with each other in the direction of the thickness.

9. A counterfeit prevention element comprising a supporting substrate, an adhesive layer, a cholesteric liquid crystal layer, and a protection layer wherein said cholesteric liquid crystal layer has on at least a part thereof a region

exhibiting diffractivity and a cholesteric liquid crystal phase wherein the helical axes are not homogeneously parallel with each other in the direction of the thickness.